

WHAT IS CLAIMED IS:

1. A picture coding method for coding a moving picture image, comprising:
 - a first step of generating, with respect to a first image, a plurality of coded data respectively having different coding quantities;
- 5 a second step of creating a plurality of reference images to be used for predicting coding by decoding said plurality of coded data;
 - a third step of performing image quality evaluation on said plurality of reference images; and
 - a fourth step of selecting at least one coded data from said plurality of coded data
- 10 on the basis of a result of the image quality evaluation.
2. The picture coding method of Claim 1,
wherein, in the first step, a plurality of target coding quantities are set, and said plurality of coded data are generated with respect to said first image, through coding performed under coding quantity control for converging coding quantities of said plurality
- 15 of coded data respectively on said plurality of target coding quantities.
3. The picture coding method of Claim 2,
wherein said plurality of target coding quantities are set with respect to each frame, and
in the coding quantity control, a coding parameter is controlled in each
- 20 macroblock.
4. The picture coding method of Claim 1,
wherein, in the first step, said plurality of coded data are generated with respect to said first image, through coding performed by using a plurality of different coding parameters.
- 25 5. The picture coding method of Claim 1,
wherein said first image is provided frame by frame, and
said at least one coded data is selected in each frame in the fourth step.
6. The picture coding method of Claim 1,
wherein said first image is provided frame by frame,
- 30 in the first step, n (wherein n is an integer of 2 or more) predicting coded images are created, with respect to said first image, by referring to n reference images of another frame, and
with respect to each of said n predicting coded images, m (wherein m is an integer

of 2 or more) coded data respectively having different coding quantities are generated, whereby generating $n \times m$ coded data as said plurality of coded data.

7. The picture coding method of Claim 6,

5 wherein, in the fourth step, n coded data are selected from said $n \times m$ coded data, and n reference images respectively corresponding to said n coded data are used for the predicting coding of an image of another frame.

8. The picture coding method of Claim 1,

10 wherein, in the third step, a reference image obtained from coded data having the largest coding quantity among said plurality of reference images is set as a referred image, and

a difference of each of said reference images from said referred image is obtained and used for obtaining an evaluation value for the image quality evaluation.

9. The picture coding method of Claim 8,

15 wherein, in the fourth step, said at least one code data is selected from coded data corresponding to reference images having evaluation values falling in an allowable range.

10. The picture coding method of Claim 8,

wherein, in the third step, a high frequency component is extracted from said referred image, and

20 in obtaining said evaluation value, said difference is modulated in accordance with said high frequency component of a corresponding pixel.

11. The picture coding method of Claim 8,

wherein a pattern of a difference image consisting of said difference is evaluated and noise information is extracted from said pattern, and

25 said noise information is additionally included in coded data corresponding to a corresponding one of said reference images.

12. The picture coding method of Claim 1,

wherein, in the third step, the image quality evaluation of said reference images is performed in each macroblock, and

30 in the fourth step, said at least one coded data is selected in each macroblock, and said coded data selected in respective macroblocks are combined to reconstruct new coded data.

13. The picture coding method of Claim 12,

wherein, in the fourth step, in reconstructing said new coded data, some of said

selected coded data that have been coded through the predicting coding are once decoded to obtain coded data having been coded without the predicting coding before reconstruction, and are subjected to the predicting coding again after the reconstruction.

14. The picture coding method of Claim 1,
 - 5 wherein said first image is provided frame by frame,
 - in the first step, inter-coding and intra-coding are performed with respect to said first image, and
 - in the fourth step, either of the inter-coding or the intra-coding is selected.
 15. The picture coding method of Claim 1,
 - 10 wherein, in the fourth step, said at least one coded data is selected on the basis of not only the result of the image quality evaluation but also coding quantities of said plurality of coded data.
 16. The picture coding method of Claim 15,
 - 15 wherein, in the fourth step, an image quality allowable range is set as an allowable range of said evaluation value resulting from the image quality evaluation and a coding quantity allowable range is set as an allowable range of said coding quantities, and
 - said at least one coded data is selected in accordance with a given rule from coded data having evaluation values falling in said image quality allowable range and having coding quantities falling in said coding quantity allowable range.
 - 20 17. The picture coding method of Claim 15,
 - wherein, in the fourth step, a coding quantity allowable range is set in each frame as an allowable range of said coding quantities,
 - said at least one coded data is selected through the image quality evaluation in each macroblock, and
 - 25 when a coding quantity of a whole frame is above said coding quantity allowable range, the selection of said at least one coded data is changed, for making said coding quantity of said frame fall in said coding quantity allowable range, preferentially in a macroblock that is less degraded in the image quality and more largely reduced in the coding quantity through change of the selection.
 - 30 18. A picture coding apparatus comprising:
 - a picture coding unit for generating, with respect to a first image, a plurality of coded data respectively having different coding quantities;
 - a local decoding unit for generating a plurality of reference images to be used for

predicting coding by locally decoding said plurality of coded data generated by said picture coding unit;

an image quality evaluation section for evaluating image qualities of said plurality of reference images generated by said local decoding unit; and

5 a coded data selection section for selecting at least one coded data from said plurality of coded data on the basis of a result of processing executed by said image quality evaluation section.

19. The picture coding apparatus of Claim 18, further comprising:

a first storage section for storing said plurality of coded data; and

10 a second storage section for storing said plurality of reference images,

wherein said first storage section and said second storage section are constructed by a common memory device.

20. The picture coding apparatus of Claim 18,

wherein said picture coding unit and said local decoding unit are operated in a
15 time-sharing manner for generating combinations of said plurality of coded data and said plurality of reference images serially in time series.